Problem 3.39: Transfer Functions and Circuits

You are given the depicted network (Figure 3.81).

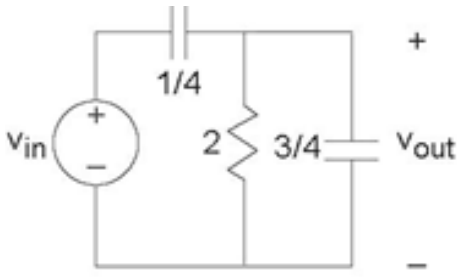

Figure 3.81 Transfer Functions and Circuits

1. Find the transfer function between V_{in} and V_{out}.
2. Sketch the magnitude and phase of your transfer function. Label important frequency, amplitude and phase values.
3. Find $v_{out}(t)$ when

$$v_{in}(t) = sin(\frac{t}{2} + \frac{\pi}{4}).$$

Problem 3.40: Fun in the Lab

You are given an unopenable box that has two terminals sticking out. You assume the box contains a circuit. You measure the voltage

$$sin(t + \frac{\pi}{4})$$

across the terminals when nothing is connected to them and the current

$$\sqrt{2}cos(t)$$

when you place a wire across the terminals.

Problem 3.41: Dependent Sources

Find the voltage V_{out} in each of the depicted circuits (Figure 3.82).

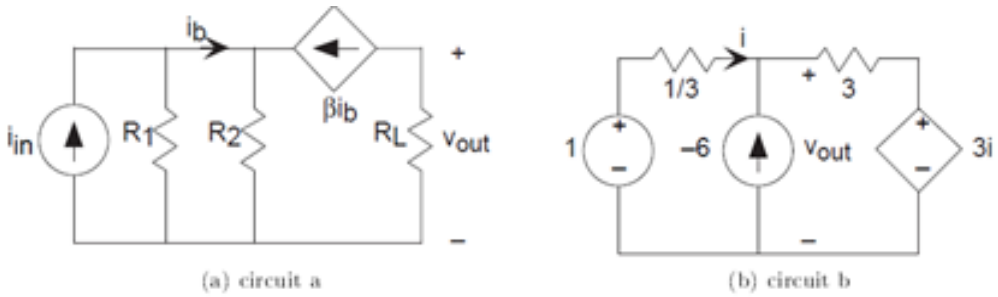

Figure 3.82 Dependent Sources